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## Agricultural Education in Delaware.

AN ADDRESS BEFORE THE

AGRICULTURAL CONFERENCE,

December 19th, 1906,

BY HARRY HAYWARD,

Professor of Agriculture and Director of the Experiment Station.

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It has long been recognized that agriculture is the basis of our national wealth. Without it, neither mining, lumbering, manufacturing, nor any other industry could live. Agriculture was the first industry of mankind, and, as long as the earth is inhabited, it will engage the energies of a large proportion of the human race.

It is because agriculture is the great fundamental industry that it has commanded the consideration of the greatest statesmen from the earliest ages down to the present time. In recent years, the United States has made the most rapid advancement in agricultural developments, and we, as a nation, are justly proud of our achievements in this direction.

While no one can question our greatness in agriculture as a nation, some do not know, perhaps, just how important agriculture is in our own State of Delaware, and what proportion of our entire wealth comes directly from the soil.

According to the last census, the corn crop in this State is worth about two and a half million of dollars; the wheat over one and one quarter million; dairy products a little over one million; live stock over eight hundred thousand; orchard and small fruit about three quarters of a million; and other farm products sufficient to make a grand total of over nine million dollars annually.

“Surely those who carry on an industry of such magnitude, and so fundamental to the welfare of such a large proportion of our population should have, as a matter of sound public policy, all possible advantage in the way of proper and thorough training for their occupation placed at their disposal.”

Possibly no industry has made greater strides in practice, as well as in theory, than has agriculture. This has been brought about by the passage of the Morrill Acts, which provided funds



Delaware has a great variety of soils which differ in their adaptability to given crops. A laboratory training teaches the farmer to recognize the farm value of these without years of unprofitable experiment with crops that may not be adapted to his soil conditions.

from the Federal treasury for education in Agriculture and the Mechanic Arts, and the passage, a little later, of the Hatch and Adams Acts, appropriating money to each State and Territory for Agricultural Experimentation and Demonstration. These funds, set aside by the General Government, have been the means of making it possible for the farmer's son, who has a natural love for a rural occupation, to study the underlying scientific principles of agriculture on the one hand, and on the other, has attracted some of the keenest scientific minds to the field of Agricultural investigation and research. In nearly every instance, the Federal funds have been supplemented by State funds. In fact, owing to the conditions governing the expenditure of the United States funds, supplemental State funds are absolutely essential.

It has been only within the past decade that the Agricultural colleges founded with the Morrill funds have been working with anything like their present efficiency, and one has but to compare our present agricultural prosperity with that of ten years ago to see that the money used in agricultural education has been well spent.

### **Advantages of Agricultural Education.**

The advantages that would result from having a man well trained in agriculture on each farm can hardly be estimated. The average yield of corn per acre in Pennsylvania is over forty bushels, in Maryland thirty-five, and in this State but thirty. It would not be impossible, with modern methods of seed selection and tillage, to double this amount, but, if it could be increased but twenty-five per cent., it would add over one-half million dollars to the annual income of the State.

The average yield of wheat in Delaware is sixteen bushels per acre. Many of our best farmers are not satisfied with twenty-five bushels, even on large areas. But if the average yield could be increased but one-third, it would mean that nearly a half million dollars would be added annually to the wealth of the State. Or, if the yield could be increased by but one bushel per acre and sold for seventy cents, it would increase the wealth of the State over \$85,000.00 annually.

Corn and wheat are mentioned because they are our leading crops. Our other products are just as capable of being improved



as these, and thereby our revenues would be increased hundreds of thousand of dollars per year.

To put this matter more specifically and to show how agricultural education may be applied; a concrete case may be mentioned. A few years ago, a teacher in one of our Agricultural Colleges came in contact with a farmer who was trying to grow fruit, but, not being particularly well informed upon the subject, was running behind a little each year. He was willing to work, however, and when the Professor had supplied him with technical information in regard to pruning, spraying, cultivating, packing, and marketing, he "caught on". To-day, the gross income, per year, from his orchards is about \$10,000.00 or about ten times the income of the average farm of his State.

If a trained teacher could be put in touch with other farmers, or if the farmer himself were technically trained, it is impossible to estimate what it would mean to the wealth and prosperity of the State.

### Education takes the Drudgery out of Farm Life.

An education in agriculture means an intimate knowledge of many different branches of learning. When the farmer's point of view is thus broadened, the satisfaction that he gets from being master of his calling, out-weighs the material benefits, important as they may be.

In many cases, for instance, the work on the farm is *hard*, because the farmer lacks a practical knowledge of the principles of mechanics, which would enable him to use pulleys and levers for the hard work. Without knowledge along many lines, the work is severe and irksome and, at the first opportunity, the farmer leaves the farm for the city or town to engage in work or business in which he has had neither training nor experience; the result is frequently disastrous.

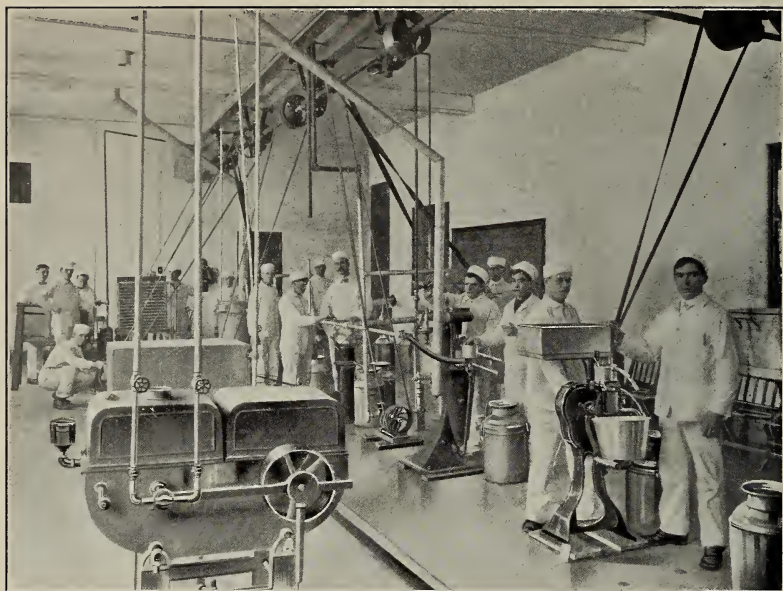
Worst of all, the boys brought up on such a farm have instilled into their minds at an early age the idea that farming is the last occupation to be thought of, and, while still in their teens, they go to the city, to wear the number of some corporation, lose their identity and, with it, their freedom and independence, which is the birth-right of every farmer.

To illustrate some advantages of scientific farming; a few years ago the writer was called to take charge of the Agricul-

tural department of a large school, where the boys themselves, by working two hours a day, did most of the work on a thousand acre farm. There was a large herd of dairy cows; the stable, like many stables, was dirty, dark, and anything but an agreeable place in which to work. It was difficult to get boys to clean out the stable. The boys, while faithful and honest, would cut this work if possible. In many instances, too, the parents would write, stating that they did not wish their sons to clean out stables; soon after the discovery that the herd was badly diseased, the stables were thoroughly renovated. Old "lean tos" were torn down; cement floors were laid by the boys, the number of windows was greatly increased; an overhead track was put up in which the stable litter was easily and conveniently removed: in short, the sanitary arrangements of the stable were complete. The result was that, instead of finding it difficult to get boys to clean the stables, they were eager to get the chance. This was also true in other farm departments; when the students saw the successful application of scientific principles to practical farming, they were eager to study agriculture, and our classes rapidly filled.

One of the great problems of the time is to keep the boys on the farm. A boy that is born and brought up on a farm has a practical experience that is worth a great deal to him as stock in trade. It is worth so much that he should think twice before giving up the line of work in which he has been trained by years of practical experience and with which he is familiar in all of its details. A calling in which he has risen from the bottom to a position where his training is worth a liberal compensation, if used either on his own farm, or on the farm of some one else. There never was a time when the demand for men with the ability successfully to manage large estates was so great as now. If then, the farm boy, instead of going to the city to begin at the bottom of an occupation, of which he knows nothing, will add a technical training to the experience he already has, he will naturally achieve a higher place in life.

If we turn to those states in which farming land is selling for from \$75.00 to \$150.00 per acre, we find that, with scarcely an exception, the farmer and his sons and daughters appreciate the great advantages that come from a knowledge of the underlying principles of their life work and their agricultural colleges are running over with young men and women who are preparing themselves for lives of usefulness on the farm. In view of these



The Dairy Industry of Delaware yields an income of over a million dollars per year. Let us cultivate it and thus increase the fertility of the soil, and hence the value of our Agricultural lands.



#### SOIL, LABORATORIES.

A Technical study of the soil in the laboratory, tends to make "dirt" more attractive in the field.



facts, is it too much to say, that, if the farmers in this State took as much interest in agricultural education as do the farmers in some of our other states, our crops would be greater, and, in consequence, our farming land would be of greater value?

Education, technical as well as practical, in agriculture will increase the income from our farms, will increase the value of farm real estate, and, by putting farming as an occupation on a level with others which require broad and accurate training, will help to keep the boy on the farm.

### Competition in Agriculture.

There are, moreover, other reasons why the farmer needs a better preparation for his work than he now enjoys. Perhaps the greatest of these is that competition for the market, which we formerly almost monopolized, is becoming keener each year. Cheap freight rates have opened our markets to the great fields of the west. As a result, the Minnesota dairyman is able to place his butter in the New York market by freight for considerably less than the Delaware or Pennsylvania dairyman can by express. The wheat fields of far off India, Russia, and the Argentine are factors in determining the price that shall be paid for the wheat in our own State. The day when it was usual for the eastern farmer to feed steers in the winter has long since passed. He could not in most cases compete with the western feeder. New England and the South are competing with us in the growing of peaches; we find new competitors each year.

Some one has well said that "The revolution by which invention and progress have forced a re-adjustment of industries, with a better relation to our natural resources, has wrenched the country and twisted it into new shapes. It has taken away the farming industry from the older states and given it to the newer territory where soils are richer. The problem left to the farmers of the Middle States is the difficult problem correctly to learn the causes of the agricultural re-adjustment; to master the qualities of the old soil for new crops; scientifically to adapt the land to the new conditions brought by the opening up of new areas of superior soil. It is a problem requiring a high order of intelligence and scientific training in farming."

And again, "wherever one finds executive ability and training in farming there is one likely to see success, as in any other

occupation of life. But I wish to emphasize my general point that from the nature of his occupation, the farmer is subjected to world wide operations requiring careful foresight; that the age is bringing him new adjustments and new problems”.

### The Conditions To-Day.

The fact is that the old methods no longer bring results, because *conditions* have changed; systems of farming that made our forebears rich are out of the question to-day. They not only did not have the virgin soil of the unlimited west to compete with in growing wheat, but the soil, which they tilled was more fertile than it is now. Again, not only did the staples of a generation ago bring a higher price, but a dollar had more purchasing power than at the present time.

Whether we will admit it or not, we are in the midst of a process of evolution in agriculture. We are obliged to adjust ourselves to new conditions. The State or individual that can do this successfully will find farming not only a pleasant occupation, but one that pays and pays well. And the State or individual that sets its face against the new order of things will surely find prosperity waning and, becoming poorer and poorer, be finally forced to the wall.

With our greatest staple, corn, yielding but thirty bushels per acre and our next greatest staple, wheat, producing sixteen bushels per acre, and selling for seventy-two cents, it will be readily seen that there is need of something being done, if we are to retain our place in the progress of the nation.

### What is to be done.

In looking for a solution of the difficulties, we naturally turn for suggestion to other states which are successfully solving their agricultural problems, to see what they have done, and to see if their methods can be adapted to our conditions.

Careful study shows that those states in which agriculture is the chief industry, are successfully meeting changed conditions by a system of education and experimentation. Iowa, through the efforts of her Agricultural College, has increased the value of her corn crop millions of dollars each year. Wisconsin, through her Agricultural College and Experiment Station, has developed

her dairy industry to such an extent that it has materially increased the price of her farm land. Minnesota, through the efforts of one of her Experiment Stations workers, has produced a new variety of wheat, particularly adapted to that state. The result has been worth millions of dollars to her farmers. Illinois, through her Station and College, discovered that the composition of corn could be changed by selection in breeding. This single discovery has been worth to Illinois alone many times what the Station and College have cost.

In each of these instances, the State has been a liberal supporter of the Agricultural College and Experiment Station. Not only by appropriating money for their use, but by sending her sons and daughters to be educated at the College. The result has been that these states, although a long way from the centers of consumption, are the leading Agricultural States of the Union. Their farm lands are selling at prices that to us seem exorbitant. Agriculture is popular, and the farmer stands high in all circles of society. He is well to do and gives the credit for much of his prosperity to his agricultural college in which he takes an active interest.

### What has Delaware done for Her Agricultural Interests.

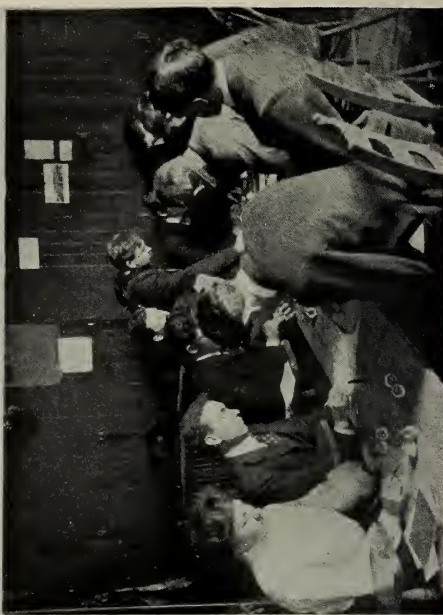
In view of the fact that Agricultural education has done so much in other states to help the farmers to meet new conditions, is it not a timely question to ask what Delaware is doing in this direction?

By Agricultural education in this connection, we do not include the agricultural press or what the farmer is doing to educate himself by means of the Grange and similar organizations. These are agencies of great importance, and should be encouraged by all possible means.

Outside of these, however, there are two state agencies; one to educate the farmer himself, the Farmer's Institute, the other to educate the farmer's son, the Agricultural College.

### The Farmer's Institute.

It is not putting the case too strongly when we say that, at the present time, the Farmers' Institutes are doing as much to enable the farmer to keep abreast of the times as any other one



Book Farming must go. The above shows how intensely practical modern instruction in Agriculture has become.



agency of the State. They are well organized and well supported by the farmers. Much attention is given by the management to the selection of speakers and the final result is gratifying. The State could well afford to make even more liberal appropriations to support this great movement.

The Farmers' Institute, however, does not and cannot take the place of the Agricultural College, any more than the Agricultural College would undertake to do the work of the Institute. The latter is intended to bring the farmer up to date in agricultural information; while the former undertakes to lay a foundation based upon the scientific principles of agriculture so that the student will always have an appreciation of any new discoveries in Agricultural Science, and know how to apply them to his own condition.

### The Agricultural College.

Was made a reality in March 1869, when the Legislature accepted an undivided half of the property of the Old Newark College. This step was taken as the only feasible one by which the State could receive the benefits from the 90,000 acres of land appropriated by the Morrill Act of 1862. The acceptance of this land on the part of the State carried with it the obligation of maintaining the entity of the fund derived from the sale of the land script and guaranteeing a fixed rate of interest upon it which is now six per cent. 'The purpose of the Morrill Act was to establish in each State and territory a college of agriculture where in should be taught those branches of learning related to agriculture and the Mechanic Arts, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.'

By this action on the part of the State, Delaware College not only was transferred in part to the State, and was designated by the State to be the recipient of benefits from the Morrill Act, as well as from the Hatch and Adams Act for the Experiment Station, but half of the trustees of the College have been appointed by the State since 1869, and the State has, from time to time, made generous appropriations to its College, for buildings.

In view of these facts, the College should be considered a State institution, the highest step in our public school

system, and its needs should be carefully considered by the Legislature.

Through the liberality of the State, the department of Mechanic Arts is well equipped with laboratories, shops, and drawing rooms, and a large proportion of the students attending the College are enrolled in the Engineering courses. At graduation, these men are eagerly sought to fill responsible positions at good salaries.

Bearing in mind that the Agricultural College was established to give instruction in Agriculture as well as in the Mechanic Arts, we naturally ask what the State has done for Agriculture commensurate with what she has done for the Mechanic Arts. To the knowledge of the writer, the State has never made an appropriation specifically for the Agricultural department of the College. As a result, there are no agricultural laboratories that correspond to the up-to-date machine shop in the department of Mechanic Arts, and, barring a little apparatus and a few pictures, there is absolutely no equipment for teaching the principles which underlie the greatest industry of the State, an industry which engages forty per cent. of our total population. The agricultural department of the Delaware College exists on paper, (it has in fact, one student). A department originally planned to be of material assistance to the farmers of the State, has been allowed to degenerate into a mere name, without weight in the institution itself or influence in the State. A department dead, and so embalmed by indifference that only a mighty effort of the combined agricultural interests of the State can ever bring it into useful life.

The agricultural conditions of the State so highly favored by location and climate, instead of looking up, are going back, as the census reports show that the value of our farming land in 1899 diminished nearly half a million dollars.

### What is needed.

It would be unbecoming, as well as useless, to seek to place the blame for existing conditions. We should be more concerned with the future than we are with the past. The purpose of this paper is to present the needs of the Agricultural Department of the College and Experiment Station, in the hope that they will appeal to the farmers of Delaware with such force that they will unite in asking the present session of the Legislature to appropri-



This Cow after the picture was taken made an official butter record of 21.5 lbs. in seven days, and in a single day produced over 34 quarts of milk. Students working with such animals soon learn the value of *quality* in farm stock.



An Education in Agriculture is unusually broad and comprehensive. Forestry is an important subject that has been recently added to agricultural curricula.

ate a sum sufficient to enable these departments to do the work they should do for the agricultural interests of the State.

To put the Agricultural Department of Delaware College in a position to give instruction in modern agriculture, and at the same time make it possible to use the Experiment Station funds to a much better advantage, does not call for a great outlay of money; the small sum that is necessary could be distributed over a period of years, so that the expenditure any one year would be lightly felt. *The greatest need at the present time is a farm,* suitably equipped for experimental work, as well as for instruction in agriculture. It should contain from 125 to 150 acres. The buildings should include barns suitably arranged for conducting experiments with all classes of live stock, including poultry, a medium sized greenhouse, and a building adapted to experimental horticulture. A small dairy building should also be included for instructional as well as for experimental purposes. If the farm and buildings were once provided by the State, the Government funds are available to assist in purchasing equipment, as well as for general maintainance.

Another need is a small appropriation for the further development of the Horticultural interests of the State. It has been thought that this could be done to the best advantage by having a well trained practical Horticulturist come in direct contact with the fruit growers, and become familiar with the actual conditions, which would put him in a position to give assistance in way of recommendation in regard to spraying, tillage, pruning, packing, marketing, etc., He should also be able to outline and conduct cooperative experiments in a way that would be most beneficial to the orchardists. This would tend to increase the output of fruit per acre of orchard, to lessen the cost of our fruit, to increase the use of uniform packing and packages, and thus to raise the standard of Delaware fruit, which in time, would tend to attract prospective fruit growers from other states, and increase the value of our farm real estate.

If a small State appropriation were devoted to this purpose, the Federal funds, that would naturally go to the Station Horticulturist, could be used in employing a strictly scientific plant investigator, whose whole time could be spent in studying some of the problems that now confront the fruit grower, such as crown gall, which has almost ruined the raspberry industry of the State, the pear blight, and other diseases, which are playing havoc with the profits of our horticulturists.



## The State is Poor.

It may be said that the State is poor and, to carry out this plan, a large expenditure of money would be required. In view of what has been said, it will be recognized that appropriations to carry out a plan of this kind should not be considered as an expenditure from which no return may be expected, but should be looked upon as an investment.

Our State is poor, but there are other States poorer than we are by far and still they find it pays well to support their Agricultural College. There are four states, Arizona, Idaho, Nevada, and Wyoming, whose population is less than that of Delaware. All of these in 1905, appropriated sums ranging from \$14,000.00 to \$52,000.00 to their Agricultural College. There are three states, Arizona, Nevada, and Rhode Island, in which the value of farm property and the value of farm products is less than in Delaware and yet all three of these States appropriate sums ranging from \$25,000.00 to \$46,000.00 to their Agricultural College.

To supply these pressing needs of the farmer, about \$25,000.00 is needed for a farm and equipment, and \$5,000.00 per year could be very profitably devoted to developing our horticultural interests.

This is equivalent to about \$15.00 per square mile of territory in the State for the first year, and about \$2.50 per square mile per year thereafter for the great cause of Agricultural education. Outside of the purchase of a farm, it would mean an equivalent of about one-half dollar per year for each farm in the State; one-half cent per acre.

There is still another way of looking at this subject. The Federal Government is appropriating \$22,000.00 this year to our Experiment Station. This amount will be increased at the rate of \$2,000.00 each year until it reaches \$30,000.00. These funds can be used only for Experimental work. This appropriation from the general government presupposes that a farm has been put at the disposal of the Experiment Station, and, as a consequence, none of these funds can be used for the purchase of land. Not having any land under control of the College or Experiment Station, it is difficult to use this large sum of money in such a way as to be of the maximum benefit to the State, and, at the same time, comply with the regulations concerning its expenditure. If the Experiment Station could have a farm entirely under its control

for an indefinite period of time, valuable experiments in soil fertility, orcharding, and animal husbandry, involving years of scientific study, could be commenced. From these experiments the farmers should receive untold benefits.

It is readily seen that a farm, well equipped and under the control of the college, would be of great service to the State in getting the maximum benefit from the Experiment Station funds. It is not quite readily understood perhaps, just how a farm would serve the purposes of the College and the students who take the courses in Agriculture.

In a broad sense, a farm to an Agricultural Department of a College is what a machine shop is to the Department of Mechanical Engineering. It serves to illustrate the principles taught by the text book in the class rooms. While the principles of soil fertility can be taught in a class room, a farm where the students can actually see the effect of different fertilizers under similar conditions, is just as essential as the text book. In teaching Horticulture, the more practice the student has in pruning, spraying, packing, etc., under the eye of a competent instructor, the more efficient will he be when he leaves the college to make his own way in the world.

Animal Husbandry is another subject that can be taught only by the use of the animals themselves in the class rooms. It is impossible to have animals of the various classes at the command of the teacher for students' use without a farm upon which they can be maintained. Again, the study of farm machinery can not be successfully taught without actually demonstrating the use of the different types of machines, and these demonstrations require a farm. It is hoped that from these facts it has been shown that a farm is absolutely necessary to the equipment of a modern Agricultural College.

Aside from its value as a place for demonstrations, it has another value that is difficult to estimate; that is in serving as a source of inspiration to the student during his college course. The College farm, if properly conducted, will keep agricultural students filled with enthusiasm, and by so doing, will aid materially in sending them back to the farm, to take the place that their fathers are leaving vacant.

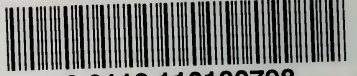
The college farm will serve still another purpose in educating the Delaware boy. Unless times have changed very materially since the writer was a college student, many of the young men

from the farm, who will come to Delaware College for a training in agriculture, will be poor, and will be obliged in a measure, at least, to work their way through college. We sometimes think that it is unfortunate that farm work must be done every day in the year, but on the college farm it would always afford an opportunity for some worthy student to help support himself while pursuing his studies.

A college farm should appeal to every farmer in the State from another and a more selfish point of view; that of direct assistance. A farm owned by and for the benefit of the State, should be conducted in the most approved manner. When a farmer wishes to see the latest farm labor saving device, he should be able to find it in operation on the College farm, and judge from an actual demonstration whether it is adapted to his conditions. From the college farm, the farmers should be able to obtain seeds, roots and new plants that have been determined to be of economic value to our State. The college farm should also be able to supply seed corn and seed wheat, as well as seeds of other crops of those varieties that are especially adapted to Delaware conditions. The surplus male animals could be loaned for the benefit of the farmers who would be asked to keep certain records of improvements made by such animals.

These are a few of the many ways in which a college farm would be of benefit to the Agricultural interests of the State. Whether or not this farm will become a reality and begin its important work next spring depends entirely upon the farmers themselves. If they do not ask for it, it surely will not thrust itself upon them. It seems, however, that the farmers of Delaware have waited long enough for a college farm. If they want an Agricultural College that will do its part in the development of the farming interests of the State, let them unite in asking the coming session of the Legislature for the most needed part of its equipment; a farm. The request is a reasonable one and will not be refused.

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